



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
DIVISION OF WASTE AND HAZARDOUS SUBSTANCES
SOLID AND HAZARDOUS WASTE MANAGEMENT SECTION

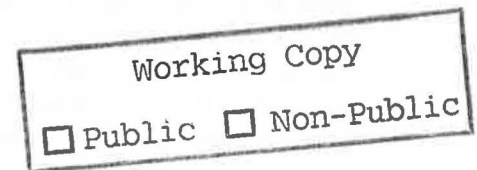
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December 9, 2014

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Mr. Sam Ghezavat, JD
Director, Environmental, Safety & Health
Bloom Energy
1299 Orleans Drive
Sunnyvale, CA 94089



Subject: Regulatory Status of Desulfurization Canisters
Reference: Bloom Energy; File Code 10

Dear Mr. Ghezavat:

The Delaware Department of Natural Resources and Environmental Control (DNREC), Solid and Hazardous Waste Management Section (SHWMS) is in receipt of your November 21, 2014 e-mail in which you provided additional information regarding the management of Bloom's spent desulfurization canisters. The response provides a justification as to why Bloom considers the desulfurization canisters exempt from regulation via the manufacturing process unit exemption found in 7 DE Admin. Code 1302, Delaware's *Regulations Governing Hazardous Waste* (DRGHW) § 261.4(c). Under the exemption, Bloom believes the waste is not regulated until it is removed from the desulfurization canister in Texas.

The manufacturing process unit exemption [DRGHW § 261.4(c)] reads:

"Hazardous wastes which are exempted from certain regulations. A hazardous waste which is generated in a product or raw material storage tank, a product or raw material transport vehicle or vessel, a product or raw material pipeline, or in a manufacturing process unit or an associated non-waste-treatment-manufacturing unit, is not subject to regulation under Parts 262 through 265, 268, 122 or 124 of these regulations or to the notification requirements of 7 Del.C. §§6304, 6306 & 6307, until it exits the unit in which it was generated, unless the unit is a surface impoundment, or unless the hazardous waste remains in the unit more than 90 days after the unit ceases to be operated for manufacturing, or for storage or transportation of product or raw materials."

Bloom's November 21, 2014 response provides a narrative describing that natural gas from the pipeline contains sulfur compounds, including mercaptan, which are detrimental to the solid oxide fuel cell used to generate electricity. As such, Bloom subjects the pipeline natural gas to "gas purification," in which the natural gas is run through a desulfurization canister to remove

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"Although the exemption is available for hazardous waste in transport vehicles and vessels, which may be moved to a central facility for cleaning (see 45 FR 72026, October 30, 1980), EPA does not interpret the exemption as applying to manufacturing process units, associated non-waste treatment units, or product/raw material storage tanks (that are stationary during operation) if those units are disassembled for cleaning off-site."

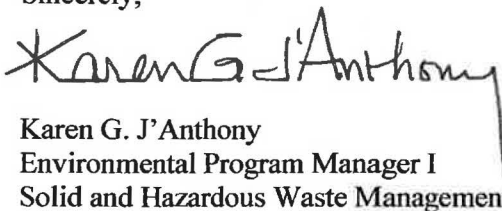
Given no manufacturing occurs in the desulfurization canister and the canister is removed from the fuel cell module for off-site processing, the SHWMS concludes the manufacturing process unit exemption does not apply. Therefore, once the sorbent material can no longer effectively capture sulfur, it meets the definition of a spent material, which is defined in DRGHW 261.1(c) as:

"any material that has been used and as a result of contamination can no longer serve the purpose for which it was produced without processing."

A spent material being reclaimed is a solid waste, as identified in Table 1 of DRGHW § 261.2. Given the spent material is a solid waste, a hazardous waste determination is required. Bloom acknowledged in its responses that the spent material is considered a characteristic hazardous waste carrying waste codes D004 (arsenic), D007 (chromium), D008 (lead), and D018 (benzene). As such, the waste is required to be managed in accordance with all applicable provisions of DRGHW upon generation of the waste (i.e., when the sorbent material becomes spent and can no longer effectively capture sulfur).

If you have any questions regarding this matter, please contact Melissa A. Ferree at 302.739.9403.

Sincerely,



Karen G. J'Anthony
Environmental Program Manager I
Solid and Hazardous Waste Management Section

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